Inner Moray Firth Modal Shift Strategy

Final Report

10th January 2020 v1.1

Summary

This project has sought to define a baseline for transport mode choice in Inverness and the Inner Moray Firth area, including establishing a methodology for monitoring progress managing mode choice through future transport and land use changes. The work was undertaken as part of a programme of work for Highland Council to support the preparation of the Local Development Plan including a spatial strategy informed by analysis of transport issues and opportunities.

Modal share has been analysed from the perspective of: personal travel data from the Census and Scottish Household Survey, analysis in the Moray Firth Transport Model (MFTM), school travel survey data (HUSS), transport assessments, travel plan surveys, and the competitiveness of car and public transport connections between people and places.

The population of the Inner Moray Firth Local Development Plan Area (IMFLDP) is growing by about 0.5% per year. The current review of the Plan intends to develop a step-change towards sustainable transport as one of the main issues within the Plan recognising that: there are many car trips in the Plan area that could be made by walking, cycling and public transport options; there are public health concerns, a climate emergency and other growing needs within a changing economy that demand increased action; Inverness city is the top priority for promoting travel behaviour change, but other towns and settlements may also have potential.

Table S1 summarises the results of this analysis for the IMFLDP area and Table S2 summarises the results for Inverness.

Table S.1 – Mode Share Baseline Analysis for MFTM area

Source	Range				
	% walk	% cycle	% car	% bus/rail	% other
Scottish Household Survey for Highland	9-20	2	75-81	2-4	1-4
Moray Firth Transport Model			95-98	2-5	
HUSS	20-63	0-19	0-35	2-74	
Transport assessments	3-31 and also 59 for a school	0-7	56-89 for houses and 10 for a school	7-19 but 40 for a care home	1-5
Derived from accessibility indicators, population and household survey data	11-16	3-4	74-80	2	3

Table S.2 – Mode Share Baseline Analysis for Inverness

| Source	Range				
	% walk	% cycle	% car	% bus/rail	% other
Scottish Household Survey for Highland	9-20	2	75-81	2-4	1-4
Moray Firth Transport Model			83-89	11-17	
HUSS	30-92	3-21	11-36	0-50	
Transport assessments	6-25	0-7	62-79	7-18	1-11 with taxi being the most popular for a hotel
Derived from accessibility indicators, population and household survey data	25-29	3	63-69	5	3

Future choice of travel will change and be affected by five main drivers: population and demographic changes; social and lifestyle changes; transport infrastructure and services; investment to influence travel choices; and personal capabilities.

Changing public attitudes, demographic change and new business models combine in complex ways for the IMFLDP area with particularly important effects related to: adoption of electric vehicles; land values and space for parking; future modes of travel where current boundaries between modes increasingly dissolve within new legislation and practice changing the concept of mode share; business models become more collaborative where community, public, and private investment are increasingly managed through new contractual approaches for lift-sharing, taxis and shared transport; and population growth and location choice will be led by broad social trends but influenced by the ability of the IMFLDP area to align change with emerging trends.

Overall the studies on which this analysis is based suggest that it is not plausible that the level of change in overall travel demand could be greater than a fall by up to a third or rise by up to about a half by 2030. In order to stabilise public attitudes at a time of rapid change, effective use of promotional and marketing approaches will be essential components of any effective transport strategy.

Figure S3 shows the scale of change that might result from an ageing population and lower car ownership. 42% for non-car modes in Inverness may not appear as ambitious as other cities are proposing with non-car mode shares of 65-70% already common across Europe. However, the analysis illustrates the scale of change which might be expected from two of the most likely changes identified in the analysis of future scenarios.

Figure S3 – Change in Possible Mode Share for All Trips 2019-2030
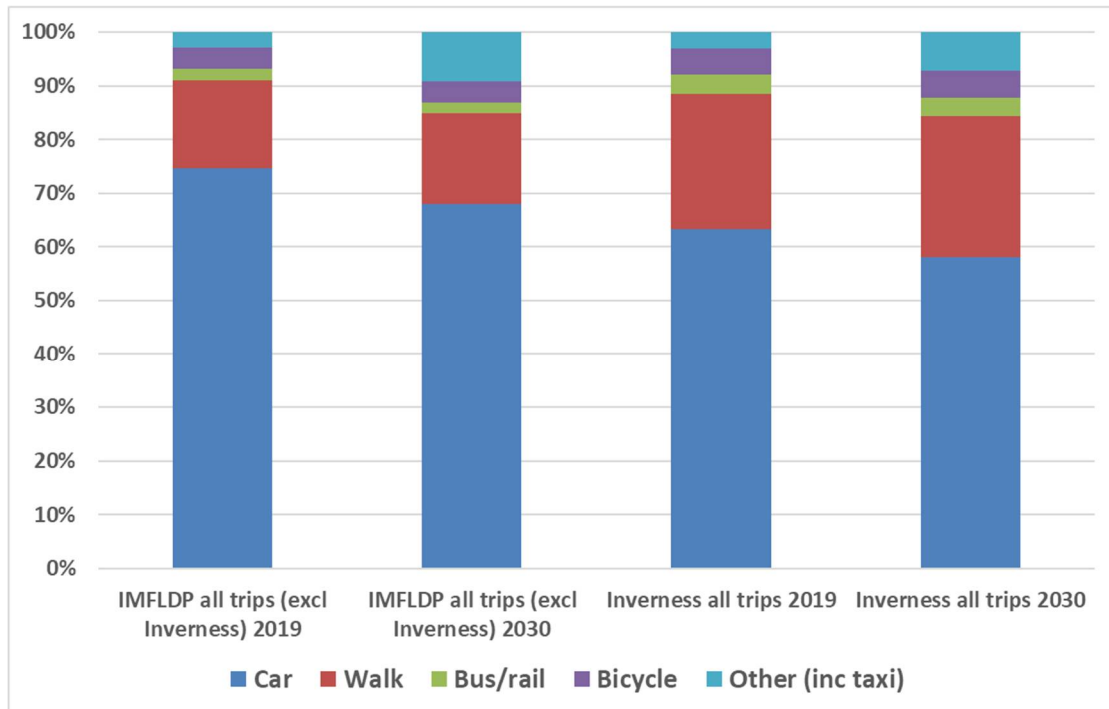
There is scope for very substantial changes in mode share through population, land use, social, demographic and technology changes. Perhaps the most important questions for policy and target development relate to the options that could plausibly be delivered through a publicly acceptable strategy in the IMFLDP.

To influence mode choice in the future policies need to extend well beyond transport. Promotional strategies consistent with the opportunities from changing technology and lifestyles can be used to lead social change. Future costs for car travel are highly uncertain and there is some scope for making public transport more competitive by reducing journey times close to Inverness.

Transport statements for new developments already include travel plans to manage future demand and there is considerable potential to strengthen these approaches.

The analysis in this report will enable the IMFLDP to set benchmarks and targets so that each neighbourhood in the area could be categorised according to the competitiveness of access to local facilities by walking, and car and public transport journey times to key trip attractors. This would allow future development proposals to be brought forward that maintain or improve consistency between the development plans and transport policy aims.

In addition to monitoring how overall transport supply and demand by each mode changes over time, local employers and facilities managers should be given incentives, such as discounts on charges or services, for providing regular updates on the travel choices of staff, customers, residents and visitors.

Contents

1.0   Introduction

1.1   This project has sought to define a baseline for transport mode choice in Inverness and the Inner Moray Firth area, including establishing a methodology for monitoring progress managing mode choice through future transport and land use changes. The project has also made recommendations on type of policy interventions needed to deliver policy goals.

1.2   The work was undertaken as part of a programme of work for Highland Council to support the preparation of the Local Development Plan including a spatial strategy informed by analysis of transport issues and opportunities.

1.3   The project comprised:

- WP1 - Inception, scoping and management.
- WP2 - Data review and mode share baseline
- WP3 - Review of planned improvements and trends
- WP4 - Target setting with associated policy interventions to achieve targets and monitoring arrangements

1.4   This report describes the results of these work packages as follows:

- Chapter 2 – Population and land use baseline
- Chapter 3 – Travel demand baseline
- Chapter 4 – Future plans, trends and scenarios
- Chapter 5 – Mode share analysis
- Chapter 6 – Mode share policies and targets

2.0 Population and Land use Data

Population

2.1 The census 2011 provides a detailed record of who lives at each location. The smallest areas that population details are available is census output areas (COA). Annual updates are made to overall population estimates at neighbourhood level (LSOA). The data is published at the census website and the latest tables were downloaded from there. The population data at COA level was weighted by the ratio of the population in each LSOA from the 2018 mid-year population to the population from the 2011 LSOA population.

2.2 The 2011 census data includes many social and demographic characteristics of the population for individuals and households. For the purposes of this work the main population and household variables of interest are: population by age group and households by car ownership. Other population characteristics can be introduced to the analysis at later stages if these are needed to scenario planning of effects of changing characteristics within the population covering health, ethnicity, education and employment effects.

2.3 In the most recent year the population of Highland grew by 0.2% and a similar rate of annual growth is expected to continue for at least the next 10 years[1]. This is slightly below national averages for population growth and relates principally to the ageing population of the Council area. Between 2016 and 2026, the 50 to 54 age group is projected to see the largest percentage decrease (-19.4%) and the 90 and over age group is projected to see the largest percentage increase (+58.3%).

2.4 The Highland Council Corporate Plan shows that the population growth is concentrated in the Inner Moray Firth and Skye and Lochalsh areas area as shown in Figure 2.1[2]. Based on these projections, over 25 years the population of the Inner Moray Firth could rise by up to 0.5% per year.

Figure 2.1 – Population Projections in the Highland Council Corporate Plan

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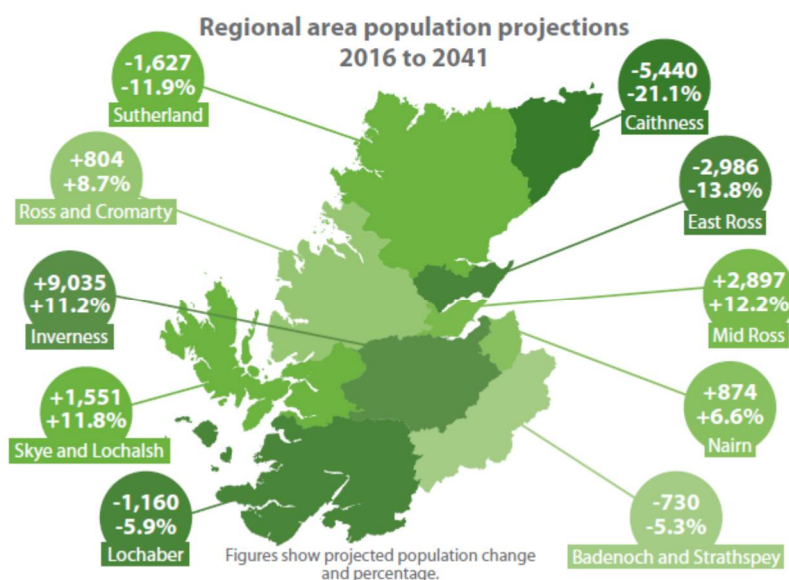
Housing market areas

2.5   The Highland Council 2017 Analysis of Property Transactions shows that 71% of households purchasing houses in the Inverness area are moving from elsewhere in the Inverness area. A further 13% of households have moved from outside the Highland Council area. These figures indicate relatively self-contained housing markets where factors other than the interaction between transport and housing influence location choices. Further analysis of the Sasines data has not therefore been considered appropriate for the modal shift strategy.

Spatial Strategy

2.6   The Highland Council spatial strategy identifies a hierarchy of location types. For the purpose of the mode choice analysis three main tiers have been selected as follows:

- **Local centres** where people can access locals schools, groceries, leisure and sports facilities. A high proportion of these trips can be made on foot or by cycle so considerations of modal shift focus on initiatives to boost the supply of local services and promote active travel. 23 local centres are defined in the current plans: Ardersier, Auldearn, Balintore, Croy, Dores, Drumnadrochit, Fort Augustus, Inchmore, Kiltarlity, Kirkhill, Tomatin, Avoch, Conon Bridge, Contin, Cromarty, Culbokie, Evanton, Maryburgh, Munlochy, North Kessock, Portmahomack, Strathpeffer, Tore.
- **Towns** where people can access a wider choice of services and facilities such as supermarkets, larger leisure facilities and workplaces. 10 towns are identified as centres of attraction: Beauly, Nairn, Alness, Dingwall, Fortrose, Rosemarkie, Invergordon, Muir of Ord and Tain.
- **Strategic employment sites and city attractions** – Inverness Centre, Inverness East/Retail Park, Inverness South/Raigmore/Lifescan/Beechwood, Longman Industrial Estate, Inverness West/Merkinch, Inverness Airport, and Nigg.

2.7   These locations are shown in Figure 2.1.

2.8   For each local centre or town the COAs within the parts of the settlement served by bus services[3] were identified. This allowed all COA in the Inner Moray Firth area to be categorized according to the settlement type: major centre, town, local centre, or other. This classification then allowed travel attributes to be associated with each location and category of settlement.   COA can be quite large, particularly at the fringes of villages where the COA boundary covers a larger rural area. However in virtually all of these cases the population weighted centre of the COA was at the edge of the COA boundary where the houses in the village were located. The selection of the COA making up each settlement was fairly straightforward using these criteria.

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[3] Up to 800metres or 10 minutes walk from a bus stop or rail station

Figure 2.1 – Key Settlements and Employment Centres
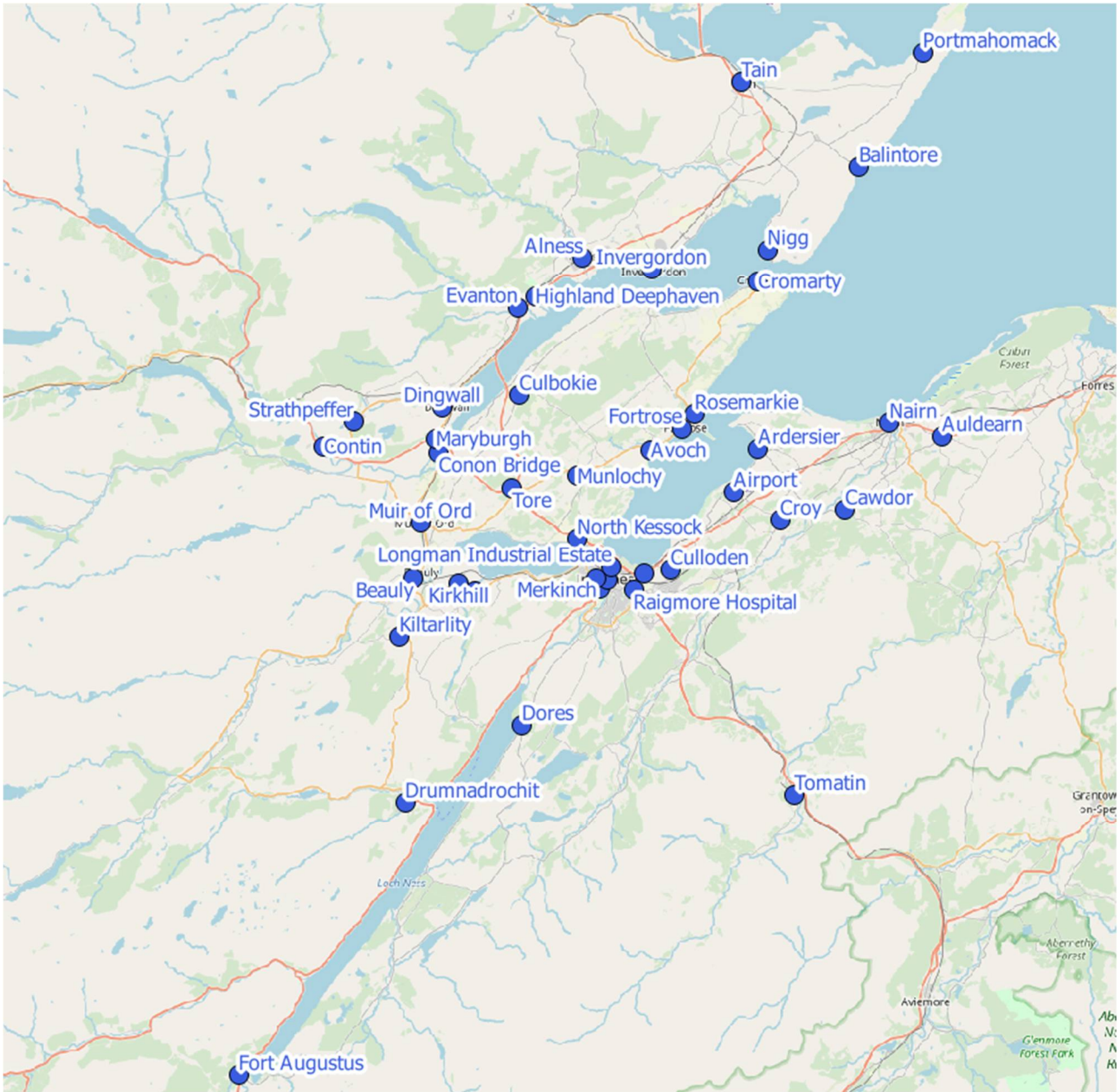
3.0 Travel Demand Data

3.1 Travel demand data was reviewed from several perspectives:

- Personal travel data from the Census and Scottish Household Survey
- The Moray Firth Transport Model (MFTM)
- Traffic counts
- School travel survey data
- Transport assessments
- Travel plan surveys

Personal travel data

3.2 National Statistics[4] are provided down to council level and show that car and cycle are more popular as modes of travel to work in the Highland Council area compared with Scotland as a whole, whilst bus and rail travel are used much less. The Inner Moray Firth area may not reflect the statistics for the whole Council area but Figures 4.1 and 4.2 shows the overall summaries for the Council area.
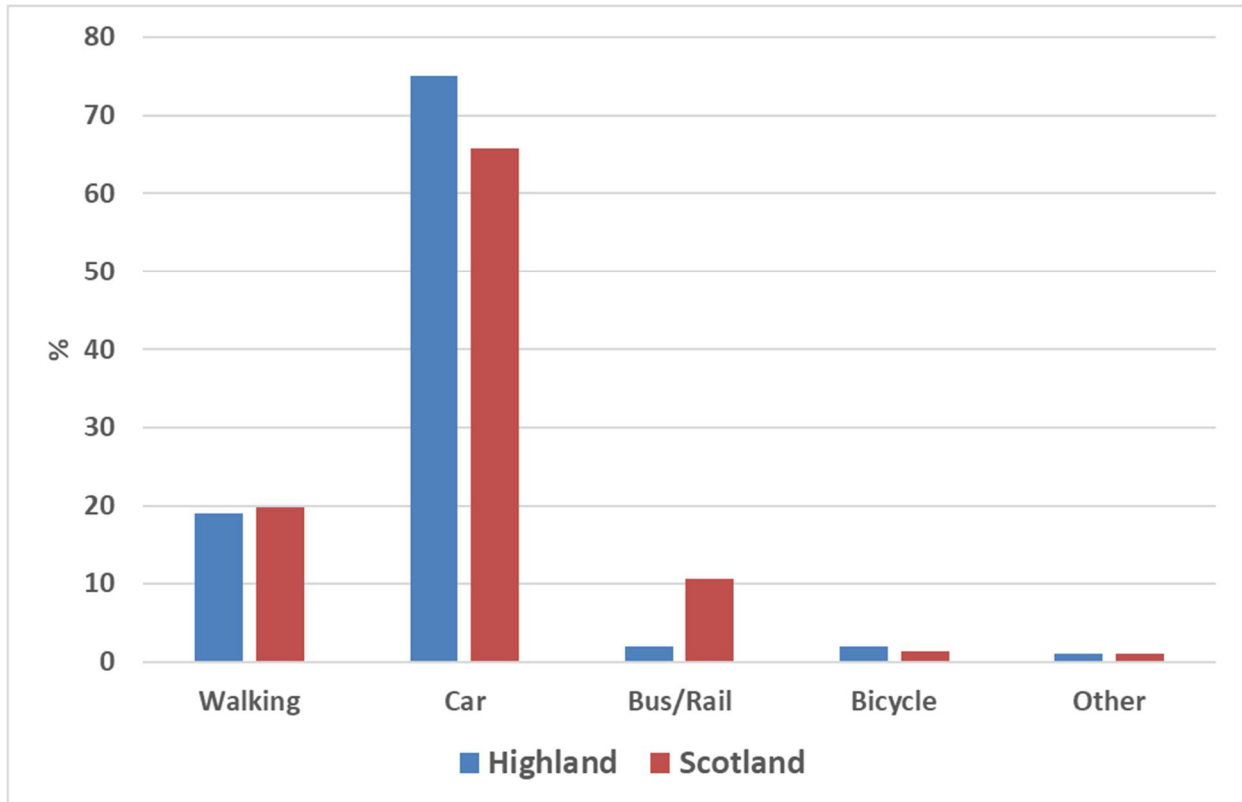
Figure 3.1 – Mode of Travel to Work
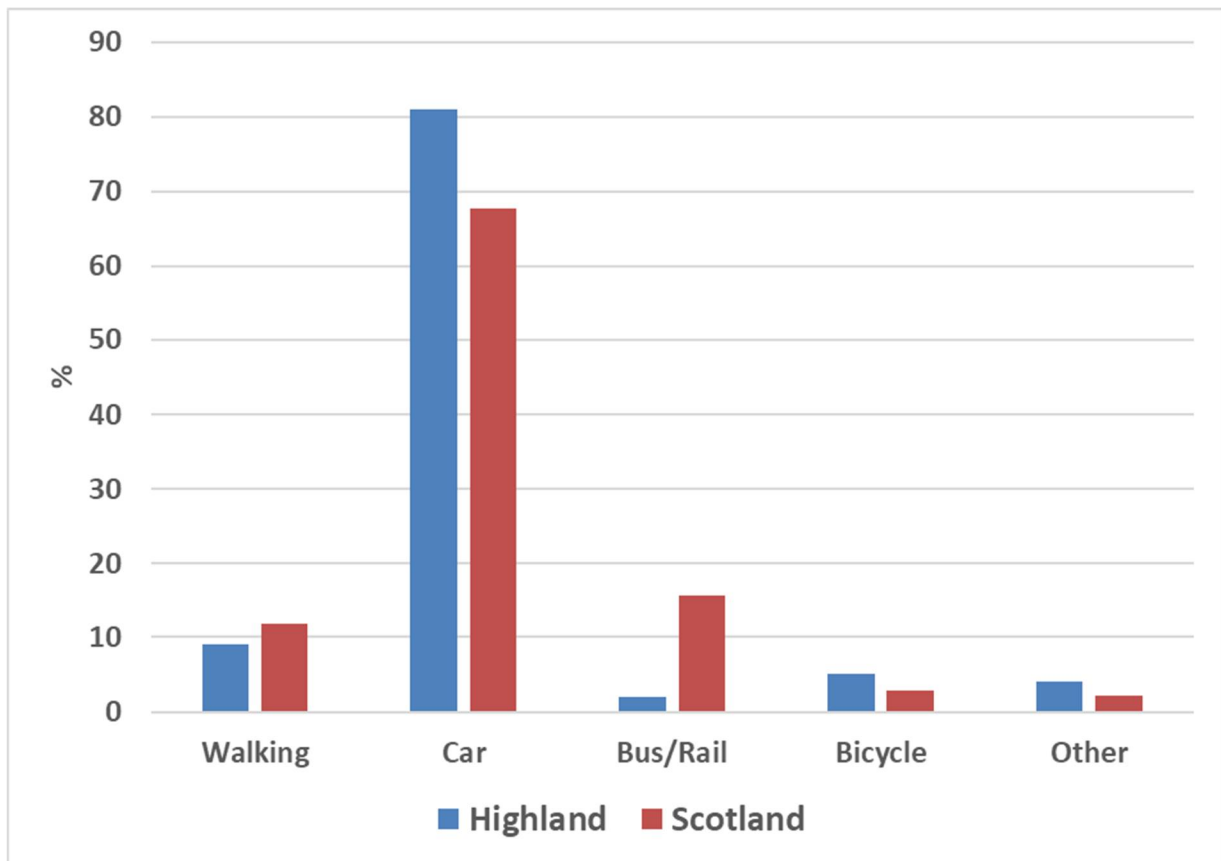
3.3 If all trip purposes are considered, the differences between Highland and Scotland are lower as shown in Figure 3.2.

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[4] Transport and Travel in Scotland 2018 - Scottish Household Survey Local Authority results

Figure 3.2 – Mode of Travel for All Trip Purposes

3.4   The census and SHS data has been used in conjunction with the transport supply data to estimate mode choice as discussed below.

MFTM

3.5   The Moray Firth Transport Model (MFTM) covers the main road and public transport network of the Inner Moray Firth area around Inverness including road and public transport assignment models and demand modelling and forecasting. Data from this model is one source of travel demand estimation.

3.6   Unfortunately, the model zone boundaries do not match COA boundaries as shown in Figure 3.3. The model zones are shown in black and the COA in green. Transport models normally build up zones from established boundaries such as COA but it may be that additional zones have been created in locations where future travel demand is expected. The COA and model zones have been clipped together so that in the analysis of travel demand each model zone is included only once.

Figure 3.3 – MFTM Zones and COA Boundaries
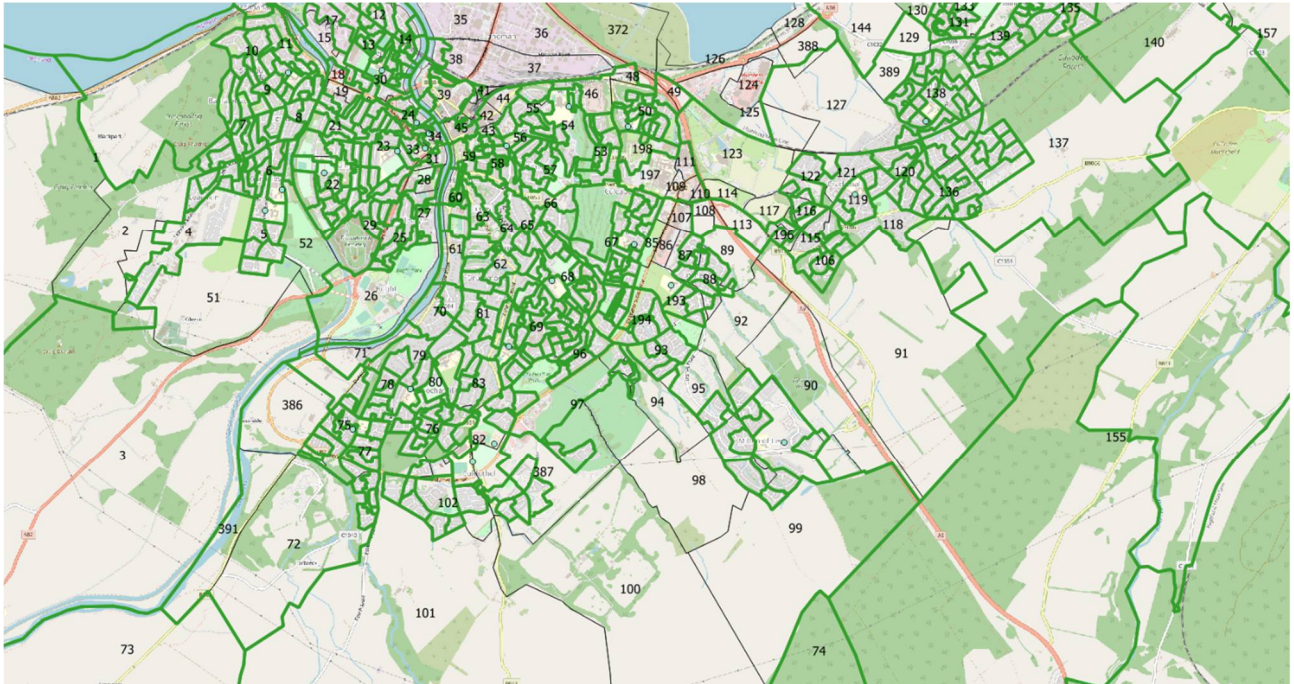
3.7   Figure 3.4 shows the modal split for travel in the peak and off peak for the different settlement types: Inverness City, towns and other centres.

Figure 3.4 – Car and Public Transport Modal Split by Type of Centre from MFTM
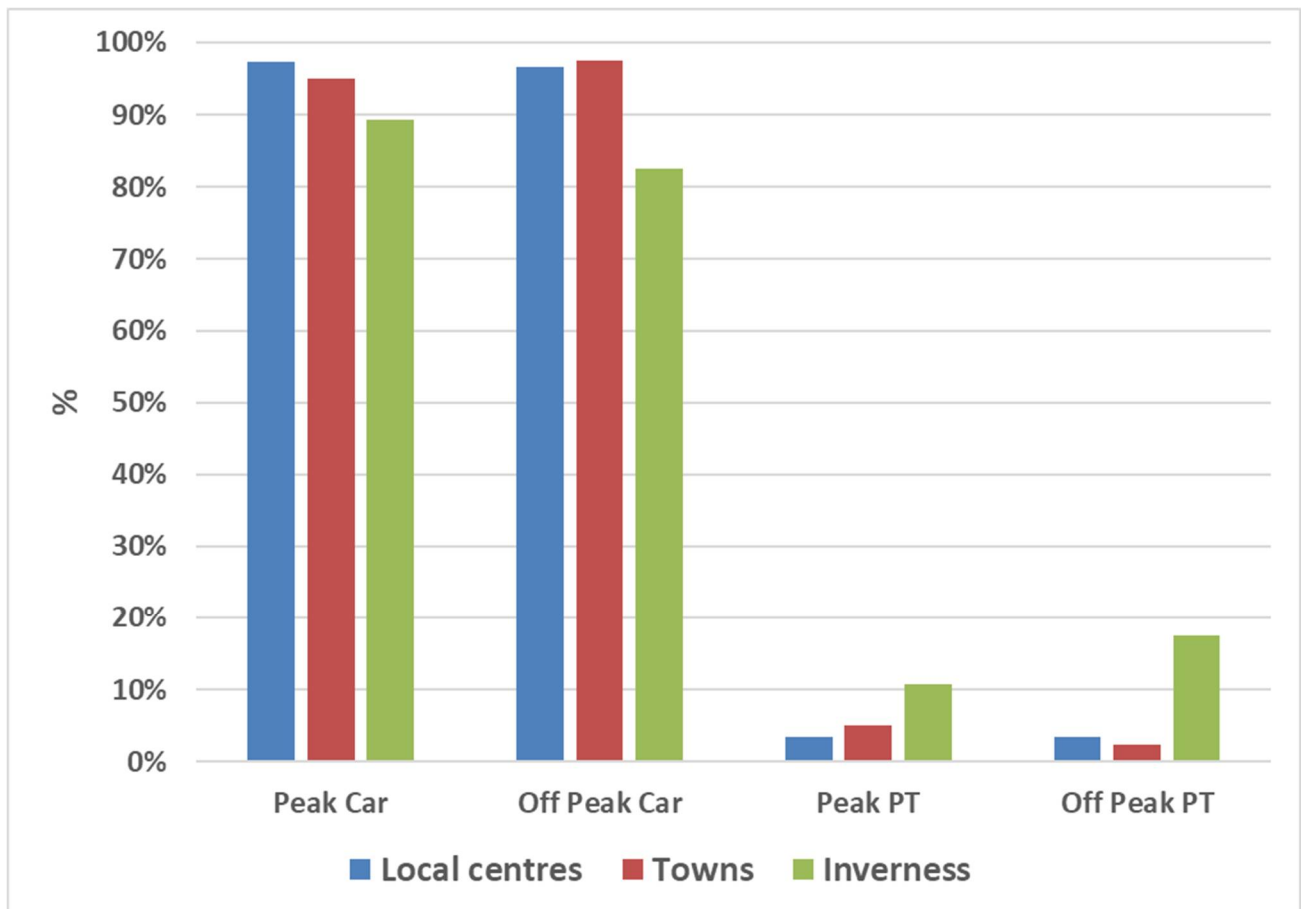
3.8 Road based transport models like the MFTM are calibrated based on road travel demand so are not expected to be particularly accurate when representing parameters that are not important to road travel demand evaluation. This means that some further work would be needed to be able to use this modelling evidence in planning mode share policies and targets for the future.

3.9 For example, at the periphery of the model area, the model currently suggests that Portmahomack has no public transport use when in practice each local centre has a significant proportion of the population who are dependent on public transport for their access. Closer to Inverness the model suggests higher levels of public transport mode share since this is important for the model to be able to represent road capacity successfully, e.g. 7% of trips from Culloden by public transport is likely to be more accurate.

3.10 Perhaps the greatest limitation on the use of MFTM data for mode share analysis is that neither walking nor cycling are explicitly modelled. With the household survey data showing 6% of trips in Inverness are by cycle and up to 20% by walking, the model data can only be used in conjunction with other analysis of these issues.

3.11 Plans to reduce car use and increase walking and cycling tend to focus on encouraging shorter distance travel such as households undertaking shopping and leisure activities nearer home so are often treated as marginal in strategic road assessments. However, around Inverness the traffic is affected by many factors not included in the MFTM. For example, the MFTM would not be able to consider large changes in modal shift that might arise highly effective travel plans by the major trip attractors. If travel plans could effect a large reduction in car trips in the Inverness area on the scale of the most successful travel plan approaches, this would affect the assessments of road projects such as at Inches junction. By using the road models in conjunction with other analysis of the effects of wider transport policy changes robust evaluations can be achieved.

Traffic counts

3.12 In addition to the evidence about mode choice, aggregated in transport models and transport statistics, it can also be helpful to include data from local surveys to help calibrate and validate the aggregated data. The MFTM was built from a large traffic using classified road travel surveys to help understand how people are currently travelling. For the purposes of this work count data is not used as primary data source, since it has already been used to develop the household travel statistics and modelling results. However local counts will be a key part of any delivery plan to help local users of the network see the changes being made and understand the contribution they are making.

3.13 A strategy to encourage mode choice change can use local traffic counts to confirm change in ways that resonate better with travellers than more centrally collected data. For example, the cycle counter on the successful cycle route between Inverness College/UHI Campus, Raigmore and Inverness city centre has shown a 30% increase in cyclists. It is not known whether these users are displaced from other routes or other modes or are new trips but when such data is used in conjunction with other data from school and workplace travel surveys it helps to validate the aggregate results.

School travel data

3.14　The hands up survey Scotland (HUSS) undertaken by Sustrans provides details of travel mode to each of the schools in the area. 36 schools in the IMFLDP area participated in the 2018 HUSS survey with mode share ranging from 20% to 92% by walking, 0% to 21% by cycling, 0% to 36% being driven and 0% to 74% by bus.

3.15　Figure 3 3 shows the mode share by type of centre. outside the larger towns and the city of Inverness pupils were less likely to be walking and more likely to be driven to school reflecting the more rural catchments for the schools.

Figure 3.3 - HUSS data
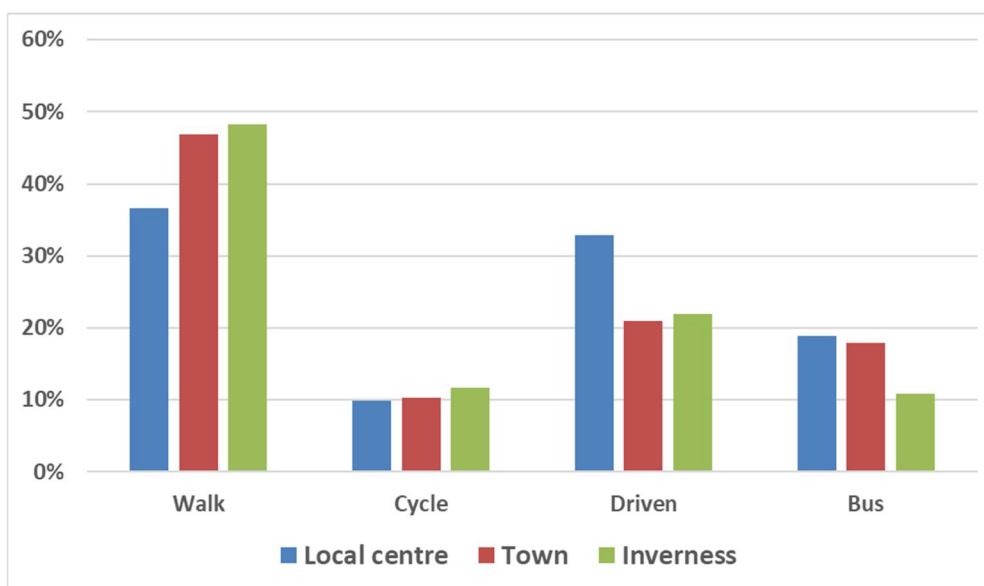
3.16　The highest levels of walking are in the Inverness area but 60% walking is also observed in some of the local centres such as Ardersier and towns such as Alness. Overall the mode share in each type of area appears to depend more on the particular school or community than any settlement hierarchy.

3.17　School travel mode share targets based on this data could potentially be included in mode share planning. The HUSS data varies from year to year but overall it appears that policies and targets could be built around changes in the overall HUSS data averages.

Transport assessments

3.18　A selection of recent trip generation estimates from recent transport statements and assessments were supplied by Highland Council. These indicate what mode share is currently being assumed in development planning practice. Transport assessments and statements are more likely to be requested for developments in larger settlements and this is reflected in the sample of assessments provided.

3.19　Table 3.1 summarises the trip generation assumptions for this selection of developments. It is of note that despite most of the developments referencing national trip generation databases, census travel to work statistics and HUSS data a wide range of assumptions are made e.g. for housing in south Inverness.

Table 3.1 – Summary of Trip Generation Rates

	Arrive	Depart	Total	Arrive	Depart	Total
South Inverness (WSP 2017) - houses	0.202	0.668	0.870	0.522	0.300	0.822
Croy (WSP 2017) - houses	0.198	0.703	0.901	0.486	0.240	0.726
Fortrose (ECS 2019) – care home	0.078	0.064	0.142	0.073	0.132	0.205
Alness (Fairhurst 2017) - school						
Nairn (TPL 2018) - mixed						
South Inverness (Fairhurst 2018) – health centre						
South Inverness (Fairhurst 2019) - housing	0.145	0.589	0.734	0.582	0.338	0.920
Central Inverness (ECS 2019) - hotel	0.060	0.117	0.177	0.104	0.059	0.163
Central Inverness (Fairhurst 2019) - hotel	0.192	0.268	0.450	0.348	0.310	0.658
Culloden (WYG 2019) - housing	0.207	0.701	0.908	0.667	0.575	1.242

3.20 Many of the transport assessments already include travel plans to influence mode share and Table 3.2 shows the assumed mode share for the development with both infrastructure and promotional measures completed.

Table 3.2 – Assumed Mode share in Site Development Plans

	Walk	Car	Rail/bus	cycle	Other
South Inverness (WSP 2017)	22	62	8	7	1
Croy (WSP 2017) - mixed	3	89	8	0	0
Fortrose (ECS 2019) – care home	30	30	40	0	0
Alness (Fairhurst 2017) - school	59	10	19	7	5
Nairn (TPL 2018) - mixed	24	58	9	5	4
South Inverness (Fairhurst 2018) – health centre	6	70	18	6	0
South Inverness (Fairhurst 2019) - housing	16	79	3	2	0
Central Inverness (ECS 2019) - hotel	25	68	7	0	0
Central Inverness (Fairhurst 2019) - hotel		70	19		11
Culloden (WYG 2019) - housing	31	56	7	6	0

3.21 Policies for mode share affect all development locations. Mode share statements for more future new developments could use similar approaches to those in the sample to identify manageable levels of mode share that can be delivered. Although travel plan commitments made in many past development plans have been poorly monitored, this approach to managing mode share change would appear to be practical for the future following the same general approaches to mode share determination as have been adopted in the above sample.

Travel plan surveys

3.22   Travel plans are increasingly common amongst larger employers as ways of managing their travel footprint. However, within the IMFLDP area there appears to be very little current action by the organisations generating the greatest number of trips to manage staff and customer travel.

3.23   In response to requests for data by Highland Council responses from Lifespan and NHS Highland were received as follows:

- Lifescan have planned a survey of staff travel for the spring of 2020 which would be a first step towards managing staff travel.
- Currently NHS Highland has an active travel policy from 2017 which the active travel officer reports is making its way into practice but has not been formally adopted at Board level. The active travel policy includes measures to encourage staff and patients to choose walking and cycling for their travel. However, it does not include any site specific analysis of current travel choices.

3.24   Travel plan data does not currently provide any assistance towards mode share policy development or target setting. Nevertheless, any mode share targets for the future will almost certainly need large trip generators to contribute to policy implementation by measuring their travel footprint.

Travel demand estimated from land use and transport supply

3.25   Current transport supply used in conjunction with population and land use data can be used to estimate the level of travel demand and mode share that would be expected by the local population based on the spatial pattern of activities and transport supply. The same general methods used in transport assessments for individual developments can be used for the IMFLDP area comprising:

- Assessing the accessibility of a location for travel to work, shops, leisure, schools and health facilities which between them account for most travel.
- Identifying the number of people and households including socio-demographic data affecting trip rates and mode choice.
- Estimating the predicted mode choice based on these characteristics.

3.26   These steps have been undertaken for the IMFLDP as follows.

3.27   There are 1222 COA in the IMFLDP area and in Chapter 2 the selection of 24 local centres, 10 towns, the city of Inverness and four other employment centres was identified. As a proxy for the varying range of local services available in each community the accessibility analysis has assumed that on average local services such as schools and grocers are available in the local centres allowing people within walking distance of the centre to walk or drive to these. For other trips access to opportunities such as work, college, leisure, hospital, friends and family the accessibility to these has been calculated as the ratio of travel times by walk/public transport to the travel time by car. Travel time calculations have been undertaken for both peak and off peak periods.

3.28   The journey times were generated a using the most widely used journey planning software used by the Scottish population, Google's journey planner. The application programme interface (API) available from Google was used to calculate journey times at 30 minute intervals between 8am and 10 am on a Tuesday. The peak

journey time was typically for arrival at 8:30am so this was used throughout for the peak. 10am was used as the off peak journey time.

3.29   Figures 3.1 and 3.2 show the ratios of walk/pt journey times between some of the centres and the main employment centres. At ratios below 4, walk/PT starts to become attractive and at ratios below 2.5 walk/PT starts to become highly competitive. Ratios of below 1.5 are usually only achieved for city locations but several of the towns appear to have highly competitive bus journey times to Inverness city centre.

3.30   Some local centres such as Fort Augustus also have ratios at low as 1.5 for travel to central Inverness. Ratios of travel times by bus or rail from most local centres to less central employment locations such as Inverness East retail park are more commonly over 10. At ratios over 10 public transport is rarely used and non-car owning households will either get lifts in cars or take a taxi.

Figure 3.4 – Ratio of travel times by walk/PT from towns to Inverness City centre
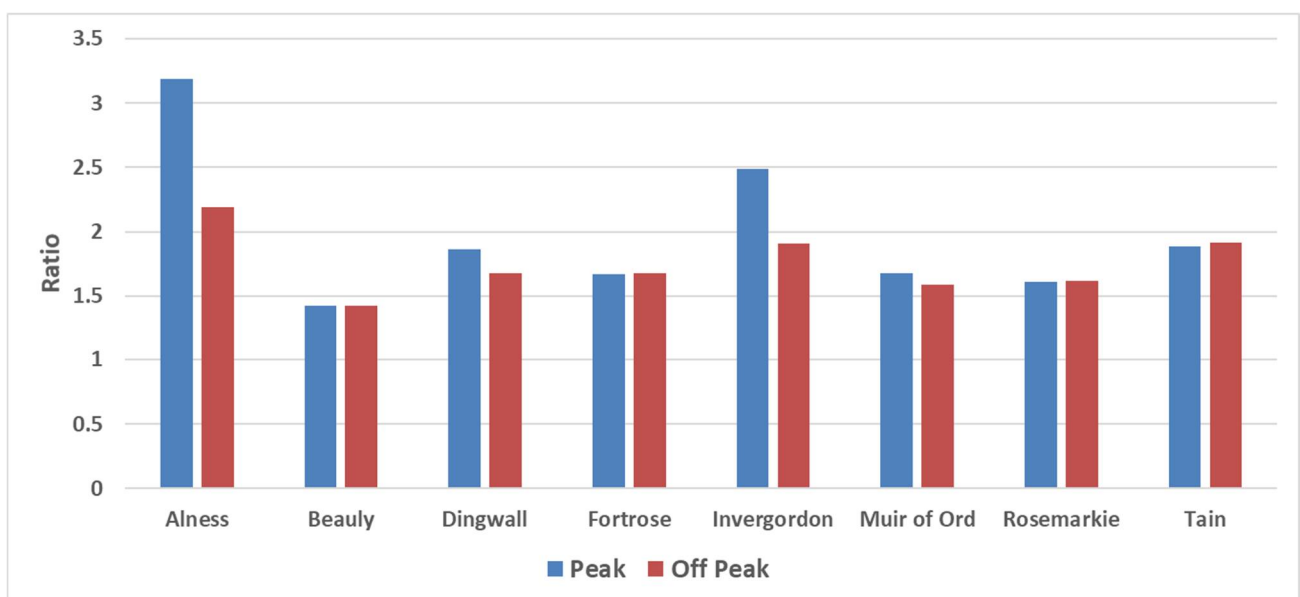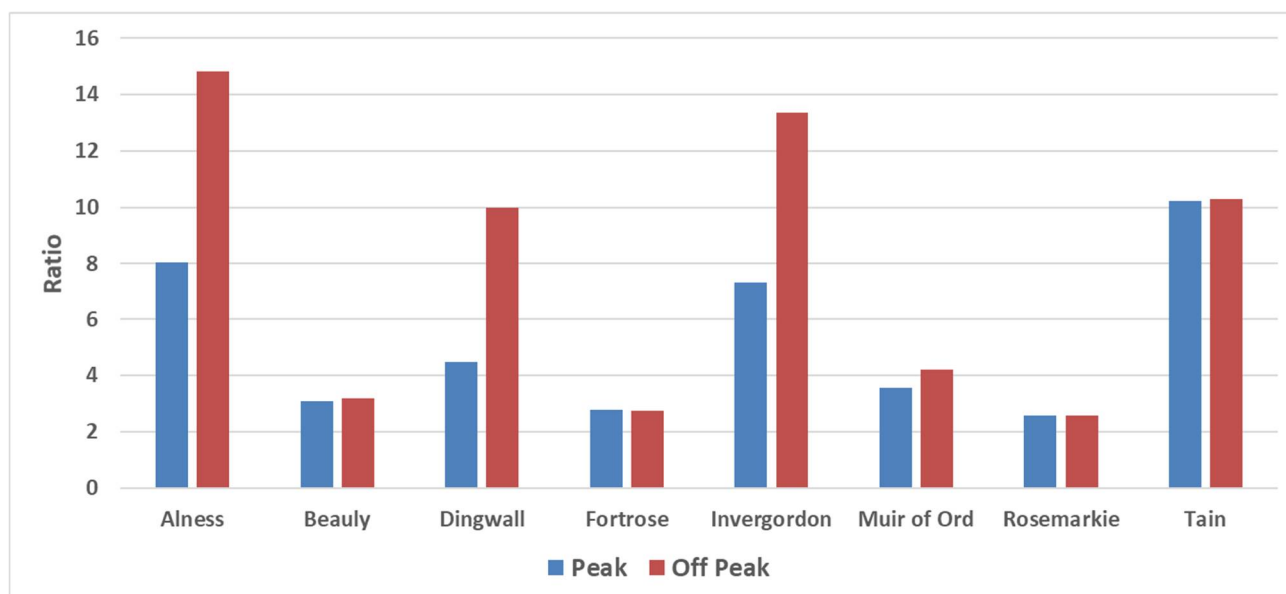
Figure 3.5 – Ratio of travel times by walk/PT from towns to Inverness East Retail Park

3.31 Table 3.3 shows the travel time ratios for areas within Inverness to key destinations in the city. For distances less than 800 metres the ratios are not well correlated with travel choices. Short walk journeys of about 5 minutes or 400 metres will be chosen by the many people even though the same journey could be made in a car in less than a minute. Over 800 metres walking remains popular for some people up to about 1600 metres. Over 1600 metres other modes generally tend to dominate and in an urban area a 1600 metres will take about 20 minutes to walk compared with about 3 minutes in a car.

Table 3.3 – Travel Time Ratio by Mode of Travel to Employment Centres and Local Services

	Ratio of Travel Times by Mode of Travel				
	Employment Centres		Grocer	GP	School
Inverness Area	Car/walk-PT	Car/cycle	Car/walk-PT	Car/walk-PT	Car/walk-PT
Charleston	4.56	2.13	<800m	<800m	<800m
Culduthel	6.35	2.71	2	3.5	4.25
Dalneigh	4.08	1.99	2.75	3.86	<800m
Drakies	4.73	2.09	<800m	<800m	<800m
Inshes	7.36	2.92	<800m	<800m	<800m
Kinmylies	4.17	2.19	<800m	<800m	<800m
Lochardil	5.74	2.23	<800m	3.22	<800
Longman	5.89	2.18	<800m	3.14	3
Merkinch	4.00	2.20	<800m	<800m	<800m
Milton of Leys	6.30	2.50	3.50	3.83	<800m

3.32 As noted above a walk trip of 20 minutes would typically show a ratio of over 6 in the table. The ratios shown therefore reflect not just the difficulties of offering competitive travel times by bus to less central business areas such as Longman, Merkinsh,

Raigmore and the Retail Park, but the relatively high ratios for shorter walking journeys from the areas to the employment centres.

3.33   Perhaps the most important conclusion that can be made from Table 3.3 is that as a compact city with employment concentrated in peripheral business parks cycling is highly competitive with car for travel to work from most parts of the city and could play a major role in serving travel to work needs for Inverness residents.

3.34   Mode share is a function of the travel opportunities available – accessibility as shown above – and the characteristics and choices of the local population. In order to calculate the choice of mode from each COA the following approach was used:

- To estimate the 2018 population by age and household car ownership for each COA the 2011 census data at COA level was factored by the ratio of the 2018 mid-year LSOA level data to the 2011 LSOA population data for: car ownership, and population by age group.
- National travel statistics were used to extract the average mode shares for The Highland Council area for travel to work and for travel for all purposes.
- Factors were derived to represent the effect of the car ownership of households in the COA based on Table 11.18 of Transport and Travel in Scotland 2018.
- Factors were derived to represent the effect of population age of the residents in the COA based on Table 11.18 of Transport and Travel in Scotland 2018.
- Using the ratio of walk/PT to Inverness city centre and Inverness Retail Park, each COA was allocated to an accessibility category.
- The predicted mode share for each COA was then calculated and weighted by the population to calculate an overall baseline mode share for the IMFLDP area and for Inverness City.

3.35   The result of this analysis is shown in Figure 3.6. This analysis provided a common baseline based on available data of what the mode share in the IMFLDP area might be. If data were available on how people actually travelled, then this analysis could be calibrated to the observed data, but in the absence of mode share observations the above estimation procedure appears to provide a useful baseline for testing future scenarios.

Figure 3.6 – Mode Share Estimates derived from Population and Accessibility characteristics of Census output areas and Scottish Household Survey trip data
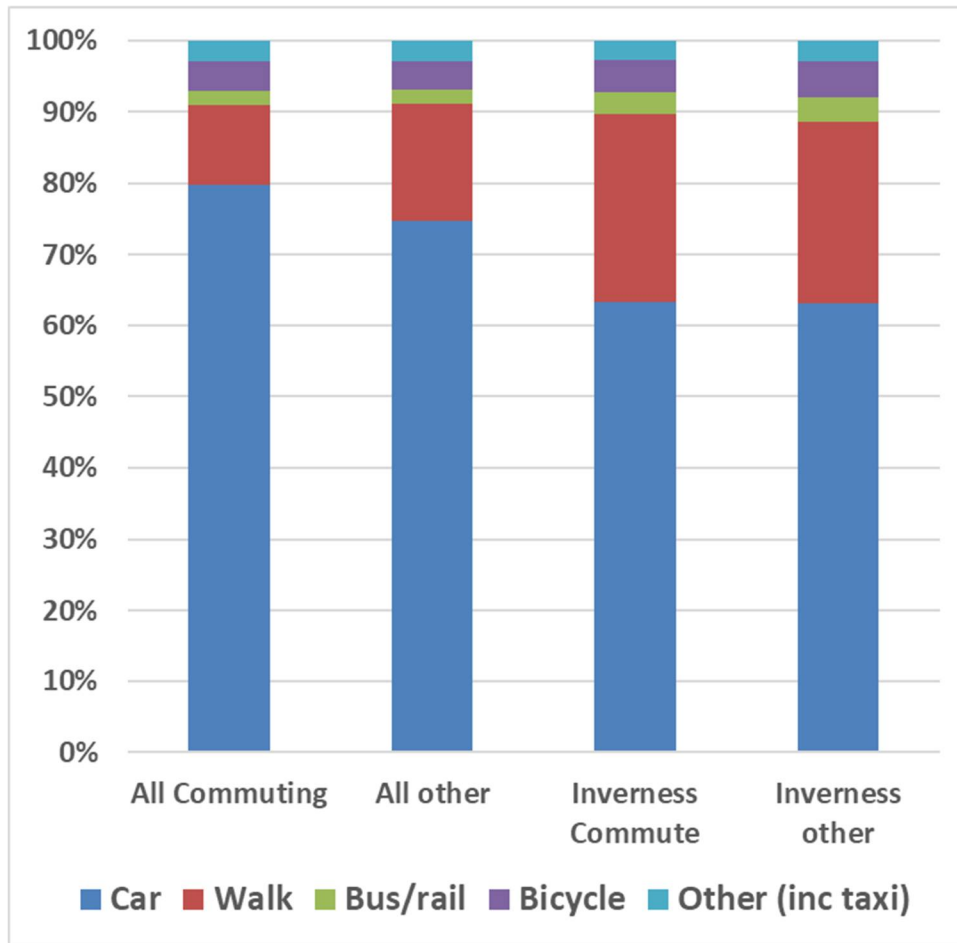
4.0   Plans, Trends and Scenarios

Land use and transport plans

4.1   The Inner Moray Firth Local Development Plan (IMFLDP) identifies where future development of housing, community and commercial uses will be located. The current review of the Plan intends to develop a step-change towards sustainable transport as one of the main issues addressed within the Plan. These plans are still emerging recognising that:

- Private vehicles will continue to play a substantial role, particularly for those living in more remote areas, those with specific mobility needs and people using them for work.
- There are many car trips in the Plan area that could change mode to competitive walking, cycling and public transport options.
- There are public health concerns, a climate emergency and other growing needs within a changing economy that demand increased action.
- Inverness city is considered to be the top priority for promoting travel behaviour change, prioritising active travel and improving public transport, but other towns and settlements may also have potential for improvement.
- Inverness is the area experiencing the greatest road congestion and with the greatest potential for mode choice change, having the highest number of short trips that could easily be made by non-car modes.

4.2   The transport modeling to look at future travel options has included:

- New housing distributed across IMFLDP in proportion to the size of the housing land allocations with 7,578 houses between 2016, the base year for the transport model and 2021, and 16,631 houses between 2016 and 2036. These assumptions appear broadly in line with the plans for new housing set out in the 2015 IMFLDP and shown in Table 4.1.

Table 4.1 – 2015 IMFLDP Housing Allocations

Housing Market Area	2011-2021	2021-2031	Total
Badenoch & Strathspey (part)	15	11	26
East Ross	2,078	1,206	3,284
Inverness	9,178	6,664	15,842
Mid Ross	2,126	1,404	3,530
Nairn	1,562	938	2,500
West Ross (part)	179	111	290
Plan Area Total	15,137	10,335	25,472

- New employment distributed across the IMFLDP development areas with an additional 4,509 jobs between 2016 and 2021 and 9,029 jobs between 2016 and 2036.
- New road schemes have been tested in future year scenarios to 2036 as follows: Inshes junction improvements, new access junction to the University of Highlands and Islands (UHI) Campus, improvements at Longman Roundabout and at Raigmore Interchange, Inverness West Link Road, Barn Church Road improvement, A96 dualling between Smithton roundabout and Business/Retail Park, and Kinnairdie Link Road in Dingwall.

- Rail schemes have also been tested to 2036 as follows: upgrades between Inverness and Aberdeen, a new Rail Station at Dalcross,

4.3 Much of the transport investment is at least partly funded by the nearby land use development plans so the actual delivery of the new homes, jobs and transport in future delivery are partly interdependent. The analysis in Chapter 5 treats this interdependence in the same way with the future year scenarios including both the land use and the transport changes.

Trends and Factors Affecting Mode Choice

4.4 There is currently a gap between people's expectations of local and central government, and the realities what can be delivered by transport authorities. Government strategy and policy documents seek to close this gap through physical changes in transport infrastructure and services, and promotional changes to influence what people want.

4.5 Mode choice is affected by many factors but for the purposes of this project to support a modal shift strategy five main categories can be identified[5]:

- Population and demographic changes
- Social and lifestyle changes, sometimes called complementary factors[6]
- Transport infrastructure and services sometimes called hard factors or practical measures
- Investment to influence travel choices, sometimes called smarter choices or soft factors.
- Personal capability and psychological factors such as skills and training related to the wellbeing and happiness of individuals[7].

4.6 Figure 4.1 summarises key elements within each category.

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[5] Whittle, C., Haggar, P., Whitmarsh, L., Morgan, P. and Xenias, D. (2018). Decision-Making in the UK Transport System. www.gov.uk/government/collections/future-of-mobility

[6] DHC 2002 Barriers to Modal Shift. Scottish Executive Central Research Unit

[7] Skills and training programmes designed as part of the delivery of wider policy goals are included in the smarter choices rather than the personal capability category.

Figure 4.1 – Factors Affecting Mode Choice[8]
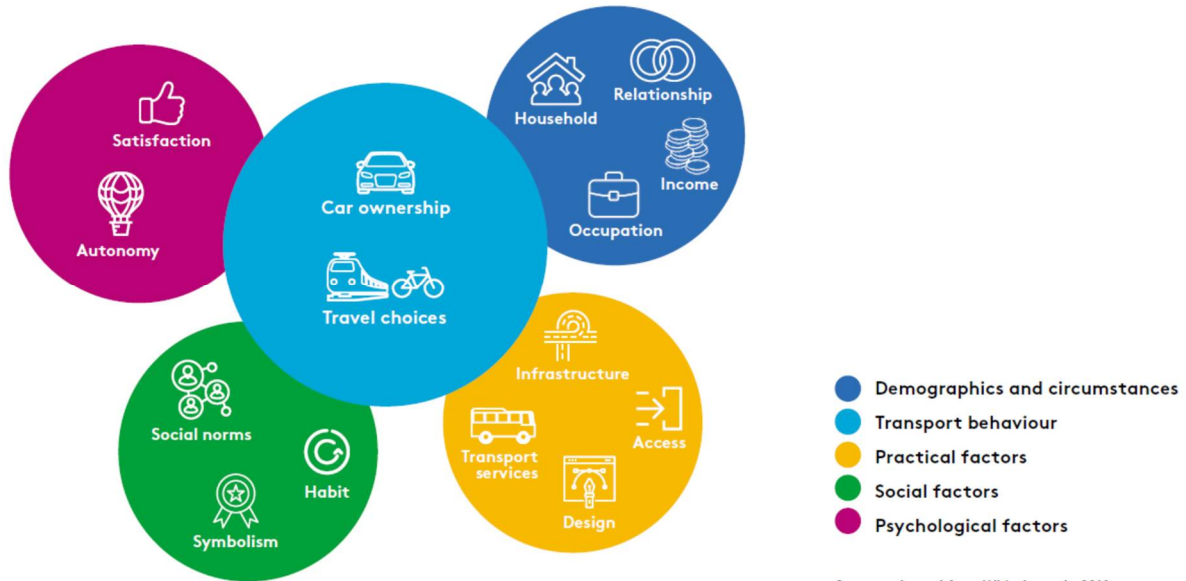
4.7 Understanding the effects of each of these factors is associated with major uncertainty which is set to grow as the factors affecting change interact in ever more complex ways. Long term planning of land use and transport can more usefully shape a sustainable future than respond to inaccurate forecasts of changes in the economy and society. Three of the most important trends creating uncertainty are summarised in Table 4.2.

Table 4.2 – Key Drivers of Uncertainty in Future Transport

Driver	Key Uncertainties
Population growth and an ageing population	• Political instability and conflict related to the gap between public understanding and sustainable social leadership • Effects of resource shortages (including space for cars) resulting in competition for resources. This could be internally destructive on current transport efficiency maximisation approaches and create pressure for more vulnerability mitigation measures including tackling greater inequity in transport provision from those least able to compete. • Economic instability particularly related to healthcare choices where public expectations and economic realities diverge leading people to locate differently to be able to access healthcare. • Changes in family life leading to more or less need to travel depending on future needs. • An ageing population could result in either more or less travel. Older people have travelled less and at different times of day to the working population but older people are now fitter and more active aiming for highly mobile and active lifestyles with fewer constraints than in the past. • Unsustainable lifestyles and uncontrolled exploitation of natural resources leading to conflict and more frequent natural disasters

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[8] 2019 Government Office for Science – Future of Mobility Foresight Report

Driver	Key Uncertainties
Changing attitudes and behaviour among younger people	• Digitally enabled people travelling differently and adopting new types of lifestyles. Living in remoter areas and travelling to workplaces less frequently can lead to increases in some travel demand but less peak hour congestion. • Lower home ownership including a shift in the distribution of economic value and polarisation of social values – valuing utility over ownership • Transformation of education rebalancing approaches to develop social values and acquiring knowledge • Starting a family later in life when the interaction of travel and childcare is different • Greater individualisation and personalisation could empower people to create, design and innovate locally with vastly decreased demand for transport
The growth of the collaborative economy and of digital services	• People are making make fewer trips and travelling less per person • The changing nature and location of work is increasing some types of travel and reducing others. • Online retail and leisure changes the function of places as travel destinations and leads to increases in local delivery traffic. • New investment structures, ownership models and valuation. This changes the balance of value in transport growth from internal efficiency maximisation to overall system efficiency. Already the knowledge about which trip movements people are making is becoming more valuable than the cost of the trip leading to radically different value chains for transport growth. • Robotics change production and service delivery and consumers switch from ownership to rent-and-use consumption • The growth of circular zero waste business models will result in business growth to reduce some types of travel demand

4.8 The uncertainties deriving from the above strategic changes are too many to list, and the way that these demographic factors, digital technologies and social attitudes interact for the IMFLDP area will result in even more profound impacts on future mode split.

4.9 Changing public attitudes, demographic change and new business models combine in complex ways for the IMFLDP area such as for:

- Widespread adoption of electric vehicles – The cost of EV use could reduce the cost per mile of car travel subject to government policy, taxation and future business models. Pay per mile travelled taxation is very likely to replace fuel tax and the details of when and how such measures are applied will be critical for future mode choice by car. The higher dependence on cars in remote areas should ideally be reflected in the policy design. However, equity for residents of remote areas has not always been as central to policy making as it could be so until policy frameworks governing these and other changes emerge, there remains considerable uncertainty about future costs for car travel.
- Land values and space for parking - The council could develop further its new approach to parking policy, including strengthening park and ride opportunities close to the city of Inverness. The baseline analysis in Chapter 3 shows that

there is some scope for making public transport more competitive close to Inverness by reducing journey times on certain services to enable mode shift. However, subsidised car parking, where land for parking is given tax breaks, is the current social norm. It is highly uncertain what will publicly acceptable for future parking policies and charges given the political instability associated with even simple changes like rating revaluations that increase valuations based on parking supply at the location.

- Future modes of travel - Public transport is evolving into smaller more flexible provision for most network coverage and larger greener vehicles in a few busy corridors. However, people currently think of public transport as comprising largely buses and trains and private transport comprising cars and taxis. New legislation is proposed that removes most current boundaries between modes and regulates vehicles on a more common basis. As concepts such as car, taxi or bus become increasingly blurred, so does the concept of mode share.

- Business models – Most of the funding for transport comes from people and development. Housing developers will currently be amongst the largest road builders in the IMFLDP area but they do not currently invest heavily in other transport. New investment approaches are emerging where community, public, and private investment are increasingly managed through new contractual approaches for liftsharing, taxis and shared transport. These approaches are currently most successful when people pay for access to services and destinations, such as taxis home from restaurants as part of restaurant bills. Internalising transport costs within the activities that derive transport demand has been a much talked about but poorly delivered area of public policy. Effective delivery of such policies within the IMFLDP would be a collaborative way to manage the travel demand for places with growing populations but the greatest uncertainty again relates to public acceptability.

- Population growth and location choice - The Inner Moray Firth might see pressures for much larger population growth from people seeking to escape the increasing constraints on some of their choices when living in other parts of the UK, such as the central belt of Scotland. Alternatively, lower population growth might be seen in the Highlands if the appeal of living in smarter cities grows in relative popularity, as increased competition from technologies in large cities could draw more people away from living in smaller towns, cities and remote areas. It is fairly certain that social attitudes will change and that the change will be resisted by some so successful development of the IMFLDP area depends on flexibly recognising the strongest assets of the area and developing mode share policies to make the most of these strengths - such as the current success in delivering higher levels of cycling than other parts of Scotland.

4.10 In order to stabilise public attitudes at a time of rapid change, effective use of promotional and marketing approaches will be essential components of any effective transport strategy.

Mode Choice Change

4.11 The future may be uncertain, but planning can still help to shape the future to make it less uncertain and more desirable. Table 4.3 shows the direction and size of

change which can be expected from each effect. The appraisal is based on how the scenario planning research[9] [10] [11] [12] [13] envisages that changes will be delivered.

4.12   For many of the issues there are both positive and negative influences so that overall the effect on mode choice depends on the balance between the factors. For example, an ageing population could be associated with less travel since older people currently travel less. However older people are expected to be relatively car dependent compared with younger groups and also to stay fitter for longer. Later baby boomers are amongst the most car dependent segments in society and will make up an increasing share of the population, so overall a weak increase in car travel is the most likely option as shown in Table 4.3.

4.13   The 'other' column includes fast growing modes like taxi services and shared taxi services which may grow rapidly as new technologies add to the competitiveness of these options with more flexible services, including in the longer-term driverless options. Some of the strongest use cases for driverless cars, with the greatest benefits for society are to enable access for people who cannot drive in remote areas.

4.14   Overall the studies on which this analysis is based suggest that it is not plausible that the level of change in overall travel demand could be greater than a fall by up to a third or rise by up to about a half by 2030. However very much more rapid changes are possible for individual modes of travel with some places changing the proportion of trips made by walking by over 20-30 percentage points in only a few years[14]. Overall it is more likely that more modest levels of change will be observed and the scope and scale of change is discussed further below.

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[9] New Zealand Ministry of Transport 2019 – Future Demand Scenarios
[10] Systra 2019 – Scenario Planning Process Report. Final Report for Transport Scotland
[11] Government Office For Science 2019 – Future Transport Foresight Report
[12] DHL 2012 – Logistics 2050 – A Scenario Study
[13] CIHT 2019 – Better Planning, Better Transport Better Places
[14] E.g. see DHC et al Going Smarter 2013 – Final report of the Evaluation of the Smarter Choices Smarter Places Programme for Scottish Government

Table 4.3 – Relationship between Future Scenarios and Choice of Mode

Trend	Car/van	Walk/cycle	Bus/rail	Other
Political instability and conflict related to the gap between public understanding and sustainable social leadership	+++++	---	----	++
Effects of resource shortages	+	++	+++	+++++
Economic instability particularly related to healthcare choices	++++	--	-	++
Changes in family life leading to more or less need to travel	--	++	--	++
Ageing population	+++	+	++	
Unsustainable lifestyles and uncontrolled exploitation of natural resources	+++	---	--	+
Digitally enabled people travelling differently	---	+	+++	++++
Valuing utility over ownership	--	++++	++	+++
Transformation of education	+	++++	+	++
Starting a family later in life	+	+		
Empower people to create, design and innovate locally	----	++++	-	+
People make fewer trips and travelling less per person	---	+	---	+
Changing nature and location of work	-	---	---	+
Online retail and leisure changing the function of places as travel destinations	+++	--	---	
New investment structures, ownership models and valuation	+++	++++	----	++++
Robotics change production and service delivery	+	--	+	+++
Circular zero waste business models	--	++++	--	+

5.0   Mode Share Analysis

Baseline

5.1   Based on the analysis in Chapter 2 and 3 the mode share baseline for the IMFLDP area is summarised in Table 5.1.

Table 5.1 – Mode Share Baseline Analysis for IMFLDP area

Source	Range				
	% walk	% cycle	% car	% bus/rail	% other
Scottish Household Survey for Highland	9-20	2	75-81	2-4	1-4
Moray Firth Transport Model			95-98	2-5	
HUSS	20-63	0-19	0-35	2-74	
Transport assessments	3-31 and also 59 for a school	0-7	56-89 for houses and 10 for a school	7-19 but 40 for a care home	1-5
Derived from accessibility indicators, population and household survey data	11-16	3-4	74-80	2	3

5.2   Key points to note are that:

- There are plausible approaches to estimating the baseline mode share that yield very different results
- Survey data shows far higher levels of cycling in the area than can be predicted based on the national averages and trends. There appears to be a stronger cycle culture in the area than is predicted by the data.
- The MFTM data would need to be used in conjunction with other analysis to adjust for the apparent gap in not considering walking and cycling trips.

5.3   Figure 5.2 shows that the range of uncertainty is lower for Inverness.

Table 5.2 – Mode Share Baseline Analysis for Inverness

Source	Range				
	% walk	% cycle	% car	% bus/rail	% other
Scottish Household Survey for Highland	9-20	2	75-81	2-4	1-4
Moray Firth Transport Model			83-89	11-17	
HUSS	30-92	3-21	11-36	0-50	
Transport assessments	6-25	0-7	62-79	7-18	1-11 with taxi being the most popular for a hotel
Derived from accessibility indicators, population and household survey data	25-29	3	63-69	5	3

Sensitivity of Mode Share to Future Scenarios

IMFTM

5.4   The land use and transport changes identified through to 2036 have been tested using the IMFTM. As noted in Chapter 3 these results need to be viewed in conjunction with other analysis of walking and cycling but they allow a like for like comparisons between the road and public transport networks with and without the planned housing, road, and rail schemes.

5.5   Figures 5.1 and 5.2 show that the area will become slightly more car dependent as a result of the planned changes.

Figure 5.1 - Change in Peak Hour Mode Choice from Proposed Land Use and Transport Changes

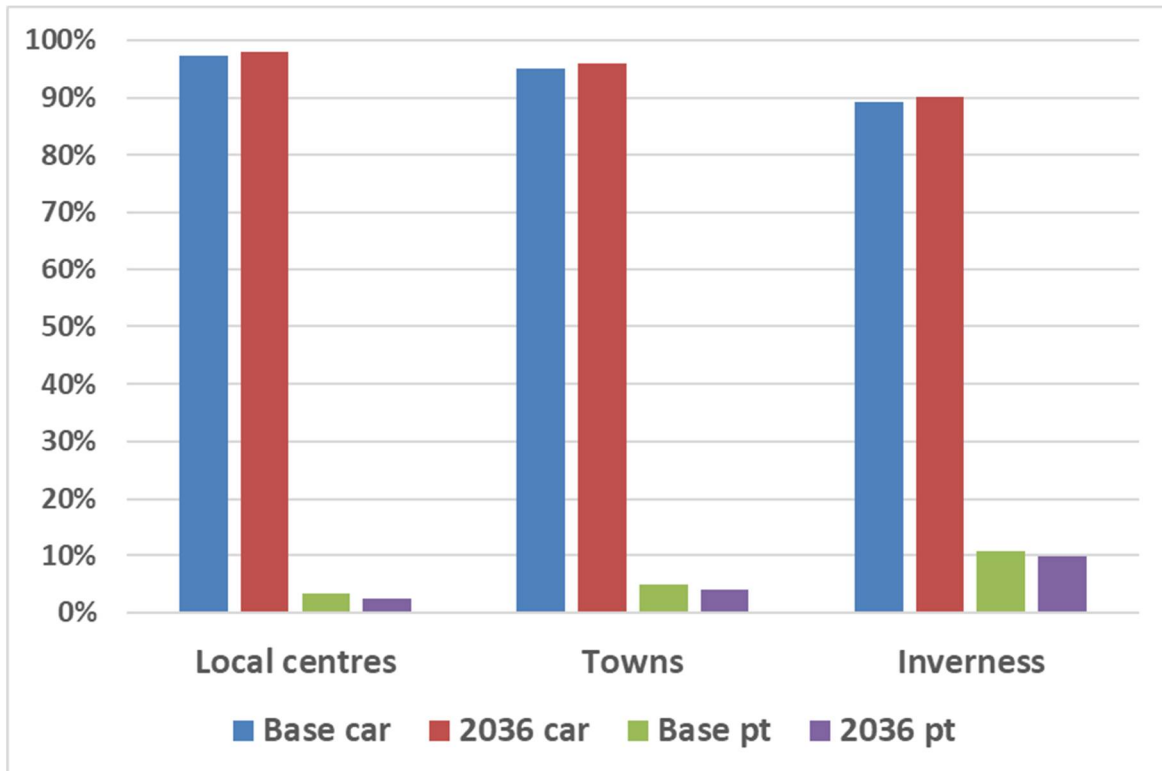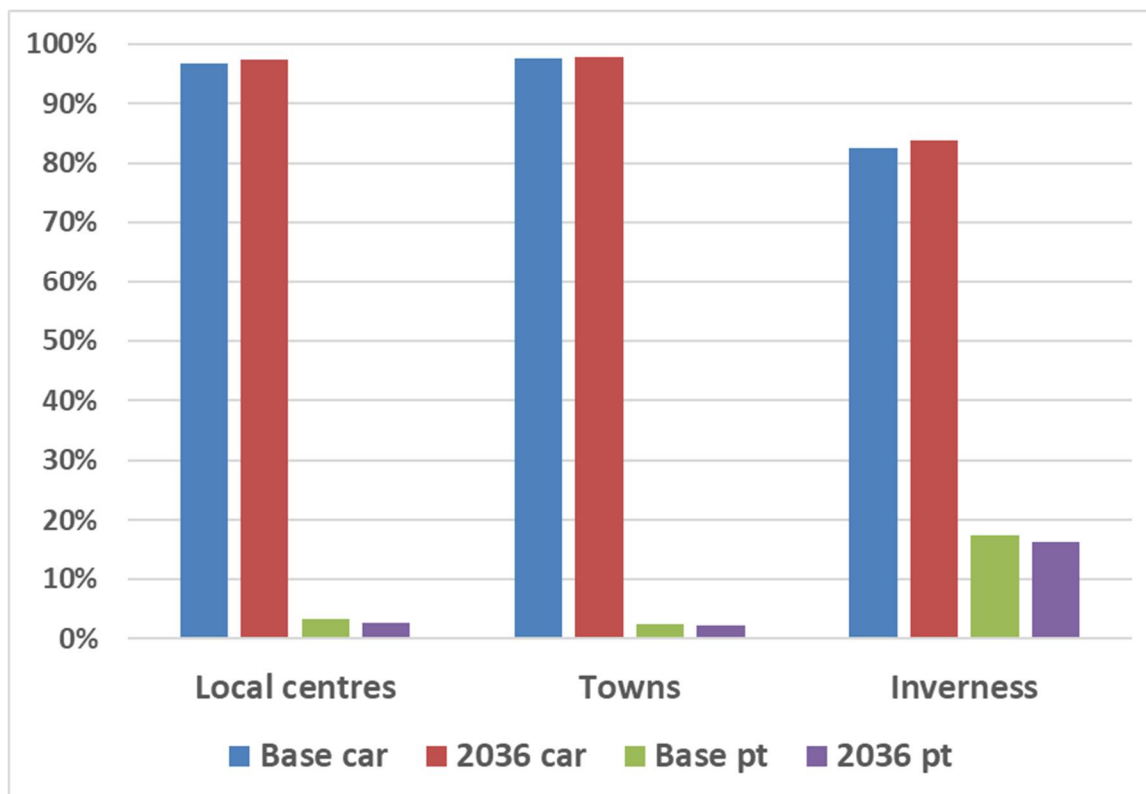**Figure 5.2 – Off Peak Mode Choice from Proposed Land Use and Transport Changes**

5.6   This small increase in car mode choice is to be expected since:

• New development only changes patterns slightly since most land uses and transport provision stays the same, so the changes are relatively small.

• New development locations are nearly always more car dependent than older ones. The most accessible locations tend to be developed first. New housing needs to make sufficient investment in public transport networks to overcome the inherent disadvantages of locations that, in general, will have less well-developed public transport provision compared with existing locations. The planning of this enhanced public transport is currently assumed to be undertaken at detailed planning stage rather than as part of strategic plans.

5.7   As discussed in Chapter 6, new mode choice policies are likely to be more about changing the planning practices that lie behind these assumptions than they are about the land use and transport changes being tested by the IMFTM. Important strategic issues such as the design of smarter choice programmes often receive very little or no planning[15] when less strategic issues such as road investment at congested junctions often receives more attention in planning.

5.8   The accessibility analysis discussed below gives some indication about the practical opportunities for people and places to use different modes. Developing such analysis could help to identify the policies and programmes with potential to support modal shift.

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[15] DHC etc al 2013 – Going Smarter – Final Report of the evaluation of the Smarter Choices Smarter Places Programme for Scottish Government

Changes in Accessibility

5.9   As discussed in Chapter 4, the future is highly uncertain but the sensitivity of the analysis to various parameters can be tested using the sale approach as described in Paragraph 3.29.

5.10   The travel diaries in the Scottish Household Survey can be used to assess how demographic and transport changes could affect mode choice. A scenario for 2030 is tested assuming:

- A 5 year rise in the average age of the population
- A 10% fall in car ownership arising from the greater reliance of residents on demand responsive services such as shared taxis and perhaps even pilot autonomous vehicle operation.

5.11   Figures 5.3 and 5.4 apply these age and car ownership changes to factor the average mode share for the Highlands to illustrate the level of change that might result by 2030 within the IMFLDP area.

Figure 5.3 – Change in Possible Mode Share for Commuting 2019-2030 within IMFLDP area
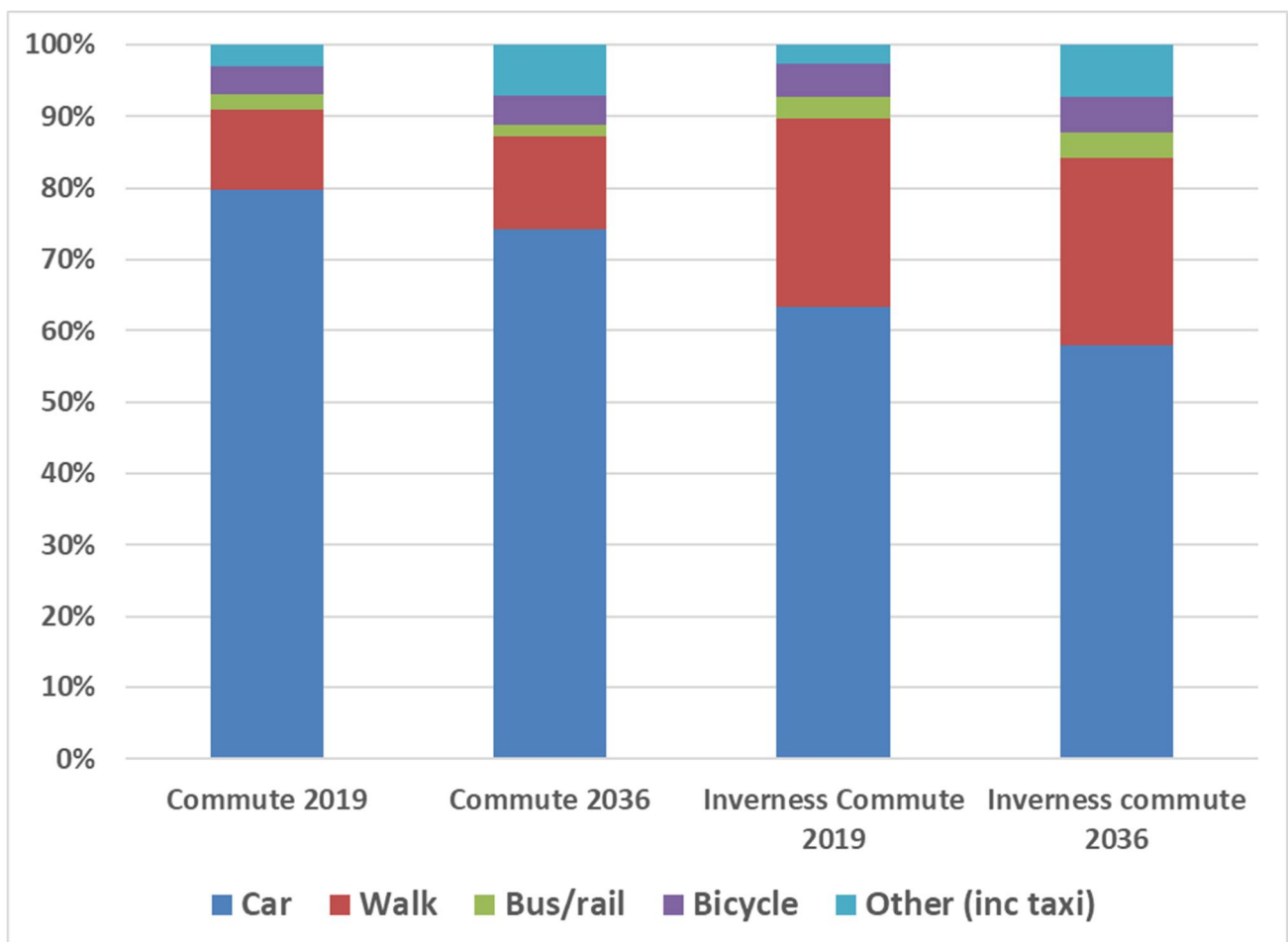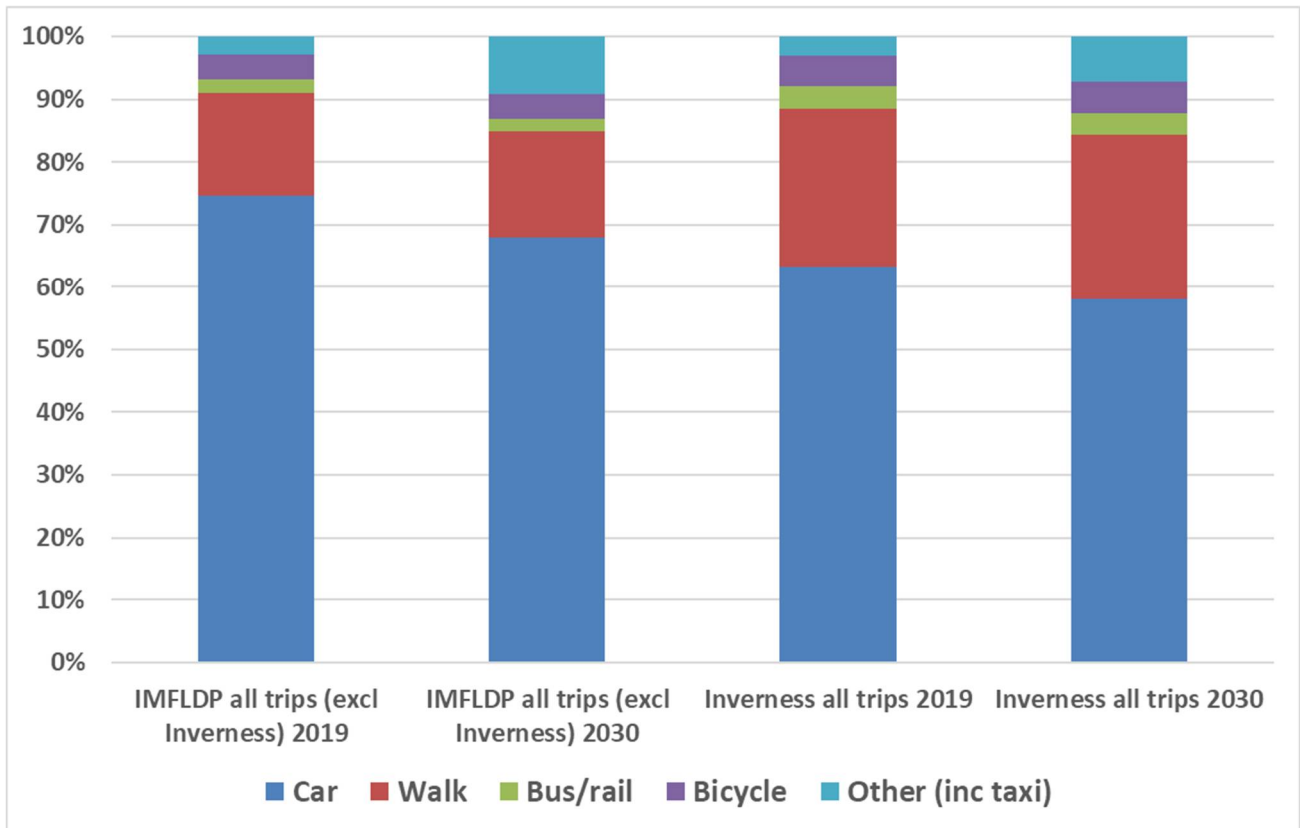
Figure 5.4 – Change in Possible Mode Share for All Trips 2019-2030 within the IMFLDP area

5.12 The change to lower car ownership results in a shift to walking and 'other' (which includes taxis and other demand responsive transport).

5.13 Residents with competitive bus and rail times are still assumed to use bus and rail with very little change in the mode share. If more locations can be served with competitive bus and rail services then the analysis could consider these effects, but no changes in the ratio of car to bus/rail times has been included in the analysis. The scope for investment in bus and rail services to be able to offer more competitive journey times appear to be close to Inverness. Currently, levels of road congestion and parking charges are however relatively low in Inverness compared with many other cities. For better bus services to become more competitive for journeys to and between the major trip attractors in Inverness substantial changes will be needed. In the short term the greater opportunities are to build on the already strong and competitive choices available by walking and cycling.

5.14 42% for non-car modes in Inverness may not appear as ambitious as other cities are proposing with non-car mode shares of 65-70% already common across Europe. However, the analysis illustrates the scale of change which might be expected from two of the most likely changes identified in the analysis of future scenarios. For example, much larger changes might occur if there were large changes in the cost of car travel.

6.0   Mode Share Policies

Future policy options and scenarios

6.1   There is scope for very substantial changes in mode share through population, land use, social, demographic and technology changes. Perhaps the most important questions for policy and target development relate to the options that could plausibly be delivered through a publicly acceptable strategy in the IMFLDP. The greatest changes will arise from population and lifestyle change in the area and successful policy must work with these wider changes. Future influences on mode choice will depend on policies and factors that extend well beyond transport.

6.2   The analysis of the influences on mode choice shows that:

- <u>Transport management strategies</u> consistent with the opportunities from changing technology and lifestyles can be used to lead social change. The leadership is best managed through the organisations that derive travel demand such as employment, retail, leisure, and local placemaking initiatives. There is already a recognition amongst some major employers that some action will be needed, but also caution with action restricted to data collection and publicity.

- Future costs for car travel are highly uncertain. National policies to phase out petrol and diesel cars could result in substantial cost changes. To help future proof the IMFLDP it could be helpful to build in assumptions that help to <u>lock in a more equitable future</u> for the area than might emerge organically from national plans.

- There is some scope for <u>making public transport more competitive</u> by reducing journey times close to Inverness that might enable mode shift. One approach might be for the council to develop further its new approach to parking policy to strengthen park and ride opportunities.

- Transport statements for new developments already include <u>travel plans</u> to manage future demand. There is considerable potential to strengthen these approaches to ensure that investment from new development is made in transport systems consistent with transport policy. The plans would also provide a framework within which to monitor changes. Successful delivery of these plans depends on developing new business models for managing mode share.

6.3   Options for policy development to influence mode choice through the IMFLDP are discussed below.

Transport management strategies

6.4   The analysis in this report suggests that benchmarks for mode share could be used to guide planners, developers, businesses and other organisations to understand how their travel footprint compares with others. These benchmarks could in some circumstances also be used as targets within policy as follows:

- Each neighbourhood in the area could be categorised according to the competitiveness of existing car and public transport journey times and the current characteristics of the population. Table 3.3, Figure 4.6 and Tables 5.1 and 5.2 summarise mode share from existing data. These could be developed into policies or targets which state the expected mode share for each neighbourhood in the IMFLDP area. These policies could be used within development briefs to define expectations for future development proposals maintain or improve consistency with transport policy aims.

- Targets could be set for particular trip purposes. Based on the analysis in this report and building on the strong spatial strategy in the existing plan, targets for walking to local services could be set. 50% of children walking to school monitored through the HUSS data would appear to be an achievable target for the area.
- Targets could also be set for trips purposes that involve longer distance travel. Employers would use travel plan monitoring to help staff reduce travel costs by making more use of shared transport such as buses, trains, shared cars and other growing forms of demand responsive transport. These targets are best set relative to a baseline measure once travel plan data has been collected so that major employment sites can demonstrate small but achievable year on year progress in the delivery of their plans.

Equity audits

6.5   Many current trends are widening the gaps in society. Policy can ensure that growing inequities are fully considered by requiring equity audits of transport changes and plans. Both development plan monitoring and plans for new development should include specific requirements for transport equity audits arising from issues such as: public transport fares rising faster than car operating costs, rising costs of car use hitting the poorest in society most, and pressure for development in the wealthiest areas leading to more transport investment in these areas.

6.6   Much of the analysis in this report has used travel time and distance when considering mode choice. Transport costs and usability also need to be considered fully within the policies to ensure that all groups in society are treated equitably. Requirements for equity audits should consider all factors affecting access: time, costs, safety, information, and physical access for all groups in the population.

6.7   When considering costs, it is also important to overcome the local effects of any national policy. Of particular importance for existing and new land use development are the different ways of taxing public transport and car travel costs. If employers or other organisations subsidise public transport fare costs these are treated as a taxable benefit for the individual, whist providing free parking is treated as tax exempt for the individual[16]. Local policy can be used to ensure that if inequities arise from this context at any local level, measures are implemented to ensure a fair society locally. Charges for car parks can be used to support the costs of subsidised public transport, so that those unable to afford cars do not face a widening gap between their costs and the costs faced by car users.

Public transport investment

6.8   The analysis in this report shows that there is currently a good level of public transport coverage to most towns and settlements, recognising that smaller settlements cannot sustain high frequency services. However, there may be potential for improvements to bus services to major employment sites, particularly from more peripheral housing areas. Currently for residents of Inverness City, journeys by walk, cycle and car travel offer much more competitive journey times so that the bus services are likely to be used only by those less sensitive to time

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[16] Land taxes for parking are considered within the rateable value of the property and employers who charge for parking may also be seen as raising the value of their property facing higher property taxes at future rating revaluations.

pressures or with lower levels of mobility. Such changes are probably best managed using travel plans for the sites attracting the greatest number of trips as discussed below (e.g. City Centre, East Retail Park, Longman Road, Raigmore/Lifesscan, Merkinsh).

Travel plans

6.9 To ensure that car users and non-car users have good access to opportunities travel plans work through the detail for each traveller group at each specific location. The requirements for travel plans are specified in the development plan and development briefs for each site and will include measures relevant to each location.

6.10 Travel plans include:

- Sufficient information and marketing about the approach to ensure that all people affected understand how the travel plan approaches help everyone to save time and money
- Measures to manage travel opportunities for each traveller group such as parking management arrangements (including visitor parking), public transport fare offers, and safe routes for walking and cycling.
- Sustainable funding mechanisms so that the costs of managing, maintaining, monitoring and refreshing the travel plan are built into its delivery. This includes sharing data with other organisations and statutory bodies so that costs and benefits can be distributed equitably in society.

6.11 There are many national and international guidance documents about how to deliver effective travel plans[17] but in the context of this work the current modal split indicates that there may be particular potential for the following to be considered.

Table 6.1 - Potential Travel Plan Measures

Type of Travel Plan	Measure	Monitored by
Residential	Maps of safe walking routes to local shops, health centres, schools and leisure facilities prepared and issue to all new homes.	• A safe walking route would be a route that is well used by unaccompanied children, vulnerable adults and includes safe road crossing points of roads.
	Well managed parking for residents and visitors including charges per space (including EV charging at individual properties or communal facilities) managed through facilities management arrangements consistent with transport assessments for the development.	• No evidence of cars parked on verges or footpaths • 100% up time and availability EV charging facilities.
	Public transport season tickets for residents at prices consistent with transport assessments for the development under the development plan (including cross subsidy from other facilities management charges such as car parking where appropriate).	• Number of season tickets in use • Bus passenger numbers by operator shared through quality partnership

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[17] https://www.transport.gov.scot/media/4811/scsp_-_goingsmarter_-_final_version_-_do_not_edit.pdf

Type of Travel Plan	Measure	Monitored by
Employment, leisure and retail centres	Staff and customer travel policy consistent with the core goals of the organisation, community and plans.	• Policy and plans shared regularly with the Council
	Well managed parking for staff and visitors including access restrictions and charges per space where appropriate.	Regular staff travel surveys
	EV charging facilities achieving 100% availability for staff and visitors	Data on EV charger use and availability
	Designated safe routes for walking and cycling to the site and waiting areas for bus stops	Feedback reports through Fix My Street or equivalent
	Public transport fare offers managed through facilities management company including links with staff benefits or retail purchases as required to achieve usage consistent with transport assessments for the development under the development plan	• Number of season tickets in use • Bus passenger numbers by operator shared through quality partnership

6.12   To encourage constant monitoring and refresh of these plans the Council could implement measures such as discounts on Council services or charges for organisations that provide data about travel and how it is being managed.